The Cost Benefit of Energy Saving Measures in Community Buildings

Independent Study

Candidate Identification number: 10618700

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1. Summary

There are a range of energy saving measures that can be implemented into community centres. Often the cheaper measures that are not necessarily visible to the public eye such as cavity wall insulation are more cost effective than the more expensive and aesthetically pleasing measures such as double glazing and new heating systems. However the impact that such measures will have on energy consumption comes down to the individual circumstances of that building, including the building fabric, frequency of use etc.
Saving energy or reducing energy consumption does not work purely by installing energy saving measures. The data collected and circumstances identified demonstrate it also requires everyone to increase knowledge awareness on the subject to ultimately change human behaviour.

2.1 Introduction

2.1.1 Why save Energy

Saving energy has become an increasingly important issue, individually, nationally and globally.
By saving energy we are;

- Helping the environment
- Contributing towards reducing the impact of climate change / green house effect
- Reducing the amount of carbon dioxide and greenhouse gases released
- Reducing expenditure on energy
- Reserving the earths resources

Energy costs have risen considerably. This is because the UK's natural gas reserves are declining. The UK now has to compete for gas in a global market, where the lack of supply worldwide, and growing demand of countries, is keeping market prices high.
We have also seen record oil prices', which also increases the price of gas.

2.1.2 Benefits for community centres

Community centres can benefit directly and indirectly from saving energy. However increasing governmental policy will start to place more pressure on community buildings to be energy efficient and look for carbon dioxide saving. It is always easier to be prepared, and take voluntary action, rather than be forced to participate. There are social, economic and environmental benefits to be made.

Direct benefits;

- Reduced overhead costs,
- Environmental accreditation status for the building,
- Reduced pressure to increase room hire charge, meaning the centre can be more competitive in the market,

Indirect benefits;

- Often demonstrates some visible action to the general public, leading to interest in energy saving measures,
- Changes people's thought pattern through practical action
- Reduced carbon dioxide emissions

2.2 Climate Change

Climate is the average weather experienced over a long period. The natural climatic changes are speeding up; this is particularly the case where the earth's surface has increased in temperature. This is known as Global Warming.
The gases that have contributed towards global warming are carbon dioxide, methane, and nitrous oxide. There is a natural blanket composed of these gases around the earth, insulating it. Due to increased human activity and development, the concentration of these gases has increased along with the thickness of the blanket meaning the heat cannot escape, causing the greenhouse effect. 'Currently over 7 billion tonnes of carbon dioxide is emitted globally each year through fossil fuel use'. (Department of Environment Farming and Rural Affairs DEFRA, 2008)

2.2.1 Impact on the UK

- Increased occurrence of heat waves
- Decreased in snow fall
- Flash floods are becoming more of a threat
- Rising sea levels are eroding the coastline.

2.2.2 Impact Worldwide

- 'Flooding has increased worldwide; this is particularly noticeable in Asia and China.
- Rain fall patterns have altered causing severe drought, particularly in Africa
- Rising sea temperatures are causing coral bleaching. This is where warm water kills the tiny algae which living coral depend on for food, energy and colour.
- Increase in the intensity of hurricanes and tropical storms, particularly in Latin America, the Caribbean and Asia'. (Energy Saving Trust EST, 2008)
- Extreme weather patterns, and change in climate are impacting farming practices, therefore the provision of food, leading to shortages

2.3 Carbon Footprint

Carbon Footprint is a measure of the impact a person or business has on the climate through releasing carbon dioxide and other green house gas emissions into the atmosphere. The' footprint analogy is used to represent it as something we leave behind for future generations to come'. (DEFRA 2008)
Our Carbon footprint is important because;

- Evidence of Climate change
- Public environmental concerns
- Political and economic actions

These factors create the need for careful management. Carbon foot printing is the basis for successful carbon management.

2.4 Current Situation

Nationally and Globally policy and legislation has being introduced to try and reduce some of the damage caused and prevent further damage, to the environmental we live in, which we depend upon socially, economically and environmentally.

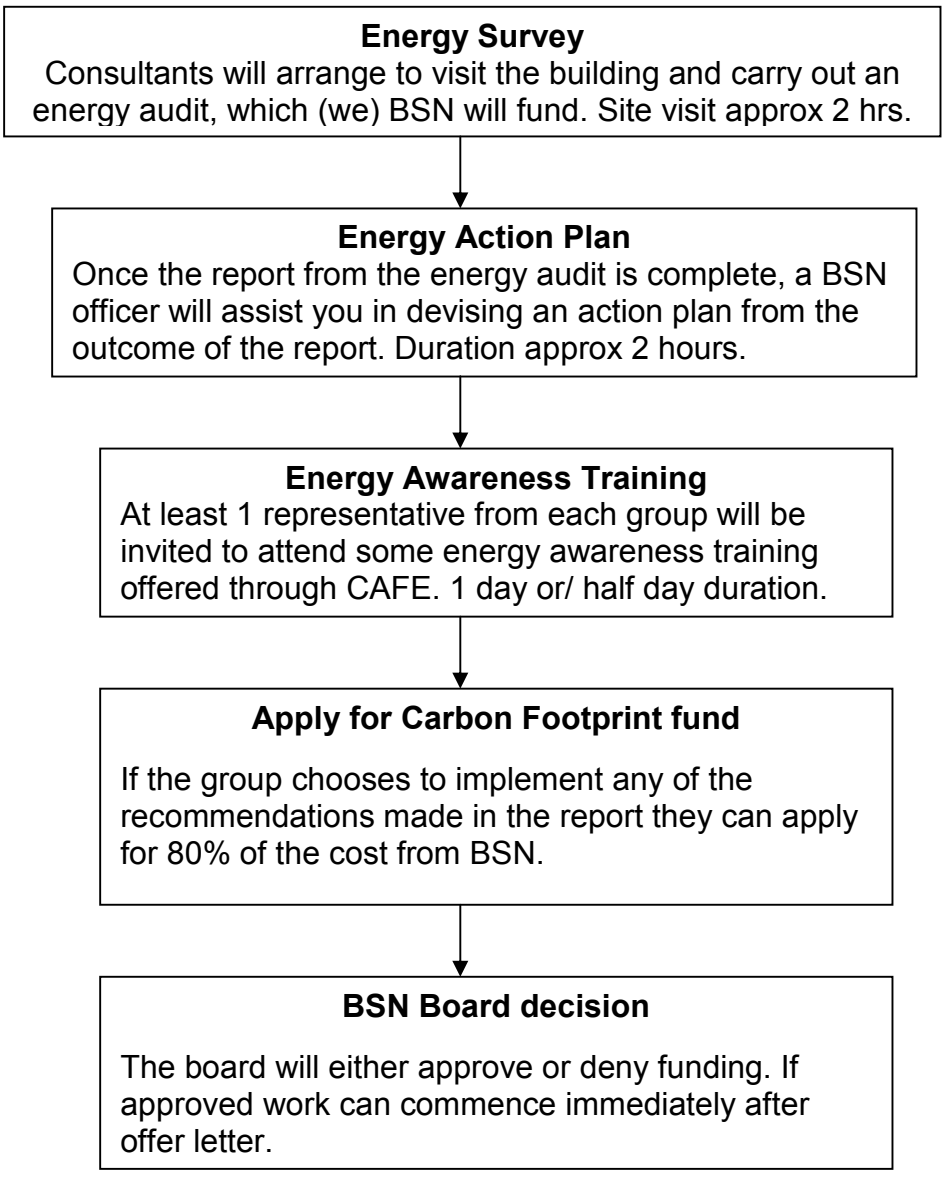
UK Kyoto Protocol requires the UK to reduce greenhouse gas emissions by 12.5% by 2012 relative to a 1990 baseline.
UK Climate Change Programme 2006 sets out our policies and priorities for action in the UK and internationally. Subsequently the **Climate Change and Sustainable Energy Act 2006** obligated DEFRA to annual reports to parliament on greenhouse gas emissions in the UK and action taken by the government to reduce the emissions
Draft Climate Change Bill March 2007 sets out a 'framework for moving the UK to a low-carbon economy'. It includes binding, long term emission reduction targets **set by UK Government** to reduce carbon dioxide emissions by 20% by 2010 and by 60% by 2050.
The Energy White Paper describes the specific measures that will ensure individual businesses and Government reduce their emissions and save energy.
The **Energy Bill 2008** is awaiting Royal Assent this autumn, 'it will implement the legislative aspects of the 2007' (Energy White Paper: meeting the energy challenge).
It will 'reflect the availability of new technologies
Correspond with our changing requirements for security of supply infrastructure
Ensure adequate protections for the environment and the tax payer as our energy market changes.
The Energy Bill alongside the Planning and Climate Change Bills will ensure our legislation underpins the long term delivery of our energy and climate change strategy'. (Department for Business, Enterprise and Regulatory Reform BERR, 2008)
The **Intergovernmental Panel on Climate Change (IPCC),** was set up in 1988 by World Meteorological Organisation (WMO) and United Nations Environment Programme (UNEP) to assess the scientific and technical aspects of climate change. IPCC assessments have been incorporated in the development of Climate Change Policy and have influenced the UK's position in international Climate negotiations'. IPCC was established to provide decision makers and other interested in Climate Change with an objective source of information about climate change. IPCC produced a 4th Assessment Report (AR4), released on 17th November 2007, which provides sound evidence that human activity is the primary cause of changes to our climate.
The **Stern Report**, written by Sir Nicholas Stern, "commissioned by the Chancellor and Prime Minister proves climate change is an economic, energy, security and political issue, not just an environmental" concern (David Miliband).
"Climate change is the greatest, long term threat faced by humanity. The cost of inaction far out weighs the cost of action" (Sir Nicholas Stern).

2.5 Setting the Scene

This project examines some of the work completed by the Carbon Footprint Initiative, through Building Sustainable Neighbourhoods (BSN), part of Warwickshire County Council. The Carbon Footprint Initiative was developed to assist community groups with buildings in Nuneaton and Bedworth, part of the Regeneration Zone which is a very deprived area. The aim was to reduce their energy consumption thus reducing their over head costs (although this may not be the case due to rising energy prices, maybe keep them static is a better term in the current economic climate) and reducing their carbon footprint.

Diagram 1 shows the process community groups undertook to participate in the Carbon Footprint Initiative.

Diagram 1 Initiative Process



Overall 16 community organisations participated in the initiative during the first 12 months. This equated to 16 energy audits, 12 action plans, 10 grants awarded.
This report examines three of these organisations, who completed energy saving measures as part of the Carbon Footprint Initiative.
All three case studies consider gas consumption, because this is the fuel the work had a direct impact upon.

All labour for energy saving measures installed as part of this project were sourced locally, to help support the local economy and to maximise sustainability.

2.5.1 Aims

This report aims to;

Assess the effectiveness of implementing energy saving measures in community buildings, to reduce energy consumption

2.5.2 Objectives

- Collate energy consumption data from before and after energy saving measures were implemented

- Explain the different energy saving methods implemented as part of the scheme.

- Compare the cost benefits of different energy saving measures

- Payback periods are used to assess the effectiveness of the measure, (this is the time it takes for the cost savings made to cover the initial capital investment cost.)

2.6 Energy Saving Measures in Buildings

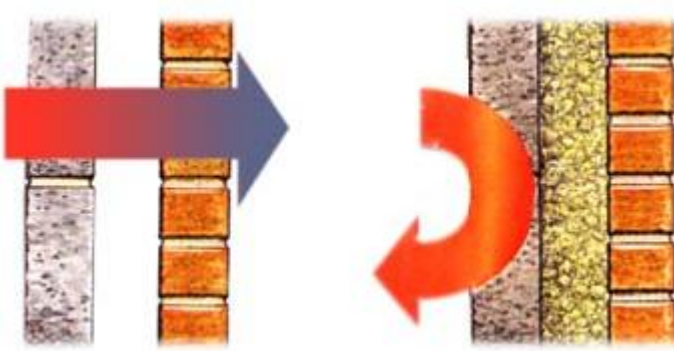
There are many different energy saving measures which can be implemented into buildings. The suitability of these measures varies according to the building. Generally energy saving measures are seen to improve the fabric of the building. They have many benefits including creating a comfortable and healthy environment, reducing carbon dioxide emissions, reducing energy wastage, therefore lowering energy bills. Measures can be divided into the following categories' of insulation, heating, lighting.
Below is an explanation of the energy saving measures implemented in the case studies included in this project.

2.6.1 Cavity Wall Insulation

In the UK most houses tend either to have solid walls or cavity walls. Cavity walls can be insulated, by filling the cavity between the inner and outer walls with an insulating material such as mineral wool or formaldehyde foam. This is demonstrated in figure 2. A series of holes are drilled into the outer wall, where the insulating material is blown or pumped into the cavity, as demonstrated in figure 1. The insulating material should not block any air vents, or flues. Once the cavity is filled, mortar is used to fill the holes. The job normally takes just a few hours.
Normal payback is 3 – 5 years, with an annual saving of around £65.
The 'U-value is the rate at which heat passes through the fabric of the building' (Julia Green, 2004). It is measured in watts per square metre per degree Celsius (Centigrade).The higher the U-Value the greater the loss of heat. Cavity wall insulation can reduce a buildings U-Value by 1.5-0.55 W/m² k.
Cavity wall insulation can only be carried out by a registered contractor on the British Board of Agreement (BBA).
Solid walls can also be insulated but it is more costly and difficult to carry out.

Figure 1

Figure 2



Source: S Walker of Heatsavers

2.6.2 Double Glazing

This is the installation of a sealed unit of low emissive glass in windows. Normally replacing single glazed windows which have high U-Values, with double glazing the 'U-Value is 2.2 W/m² k, with annual savings ranging typically in a residential home of £20-£40' (Julia Green, 2004). The most frequently quoted payback period tends to be 20 years +.
Secondary glazing is where an additional pane of glass or a layer of plastic is placed next to the original glass pane with a gap of at least 100mm between the two. This gap works in the same way as double glazing in slowing down the rate at which heat is lost. Secondary glazing is unlikely to reduce the U-Value significantly, however it can help thermal standards slightly in buildings where the window is a difficult shape or is protected by conservation rules which prohibit the installation of new windows. Secondary glazing has a 'U-Value of approximately 4.8W/m² k, saving approximately £5 - £20 per annual, with a payback period of 5- 25 years' (Julia Green, 2004).

2.6.3 Heating

Heat can be provided by a range sources including gas, electric, oil, and coal. The most suitable type of heating system will depend on the site location and fuel supply available. For example some rural areas do not have a gas network, therefore the choice is limited to electric or oil. Modern heating systems tend to be very efficient. Older systems tend to deteriorate with time, and become inefficient technology.
Suitable heating also depends on the frequency of building occupancy. Although gas condensing boilers are very efficient, they may not be practical for a building used on an ad hock basis.
In order for any heating system to be energy efficient in must be controllable. The temperature should be controllable on each individual unit, and the timing of heat required should also be controlled.

3. Case Study 1

Fact File
Location: *Bedworth Heath, Warwickshire*
Energy Saving Measures Implemented: *Cavity Wall Insulation*
Cost: *£1290*
U-value before installation: 1.4W/m² k
U-value after installation: 0.35W/m² k

3.1 The Building

The building was likely to have been built late 1960's using traditional cavity brick construction. It was originally a Co-op shop, which the management committee have now leased from Nuneaton and Bedworth Borough Council as a Community Centre for the last 20 years or so. Insulation standards in the 1960's were poor, so it had no cavity wall insulation installed, when it was built. The roof is flat, with no integrated insulation. Most of the original single glazed windows have been replaced with uPVC double glazed units. However parts of the centre have under gone a major refurbishment, and are compliant with 2004 building regulations, so will therefore have a high level of specified insulation.
Space heating is provided by two, 40kW, gas fired boilers. The existing boilers were refurbished boiler, and installed in 2004. Heat is distributed around the building using traditional radiators, which have been thermostatic radiators values (TRV's) fitted retrospectively. Hot water is supplied from the heating system and also a 6kW, stand alone, electric storage tank. The heating period for this is controlled using a 7 day digital time-control.
The majority of lighting in the centre has been up graded to the latest highly efficient fluorescent lighting.
The Centre provides a range of activities and services to the local community. It is open 5 days a week 8am – 9pm and at weekends for private hire.

At the end of 2006 the management committee commissioned consultants to complete an energy audit of the community centre, to make energy saving recommendations, and a 2nd stage to consider viable renewable energy technologies for their site.
Energy saving recommendations made were;

- Ensure heating controls are used and managed correctly
- Install cavity wall insulation
- Replace boilers with efficient gas condensing boilers
- Investigate fitting heating zoning controls
- This report suggested Biomass and solar thermal & PV were potential renewable technologies considered suitable for the site.

From the recommendations made, the centre caretaker under took some training on how to use the boiler controls, as the previous bills and meter readings suggested the heating was on continuously.
Two members of the management committee attended the

Energy Awareness Training provided by CAFE. The Centre's committee applied to BSN for an 80% grant towards installing Cavity wall insulation. By installing cavity wall insulation the consultants estimated the centre would save around £900 per year off their energy bills equating to approximately 6 tonnes of carbon dioxide emissions each year.

3.2 Results

Table 1. Case Study 1 results

Time period	Average monthly gas units Consumed
Oct 05 - Mar 06	619
April - June 06	313
July - Sept 06	23
Oct - Dec 06	349
Jan - March 07	386
April - June 07	278
July - Sept 07	166
Oct -Dec 07	183
Jan - March 08	448
April - June 08	307

(Source; Culley 2008)

The data collected in Table 1. shows the average monthly gas units consumed in this building. The cavity wall installation was installed 21st June 2007. The data in Table 1 and Graph 1 was collected from previous energy bills and direct meter readings. Graph 1 shows significant savings have been made since intervention. There is an anomaly due to the boiler not working during July and August 2006. Due to this reason the report compares the monthly units used during October - December 2006 and October- December 2007, because otherwise the results would be skewed. Analysing the data for this period demonstrates a saving of 166 gas units saved per month on average. To convert the 166 units into kWh, a standard conversion calculation is used. (This calculation is used by all professionals and fuel suppliers).

Gas Units × 2.83 × 1.02264 × 39.25 (caloric value) ÷ 3.6 = kWh

166 × 2.83 × 1.02264 × 39.25 ÷ 3.6 = 5237.9 kWh

Cost saving calculation 5237.9 kWh × 3.87p = ÷ 100 = £202.71

This represents a saving of approximately £202.71 per month. (This is based on gas prices of 3.87p per kWh).

£1290.00 ÷ £202.71 = 6.4 months

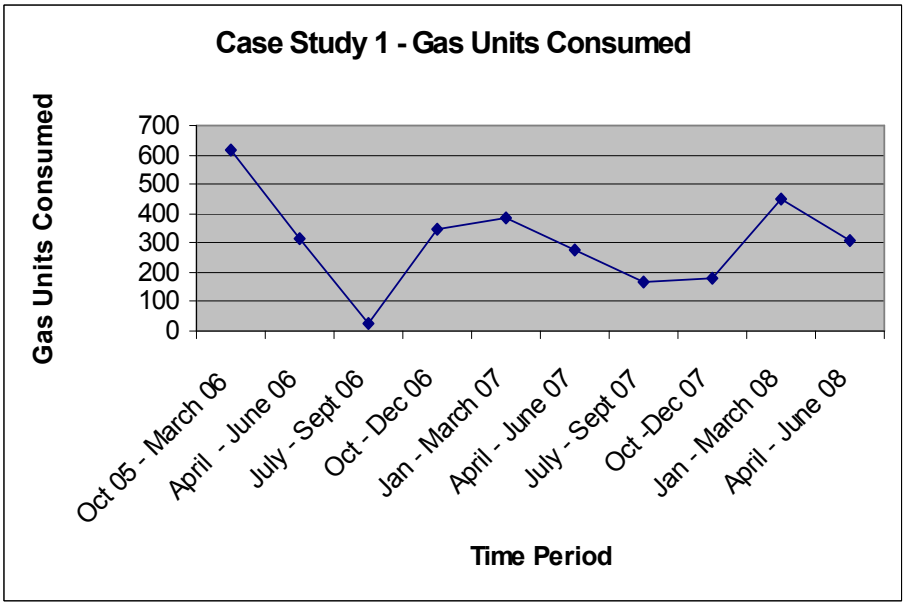
The Cavity wall insulation cost £1290.00, based on the savings calculated during October – December 2007, it would take just over six months to payback the installation cost.

To calculate carbon dioxide emissions saved, a fuel factor for gas has been applied. The factor has been sourced from DEFRA of 0.194.

Carbon Dioxide Saving Calculation 0.194 × 5237.9 kWh = 1016.2kg × 3 months = saving of 3048kg of Carbon dioxide during October – December 2007.

If these savings continued, they would easily achieve over the predicted 6 tonnes of carbon dioxide emissions.
This calculation is exceptional, however results from January 2008 onwards do not appear to be demonstrating similar savings. This could be for a number of reasons, the centre caretaker left in January 2008. The caretaker was the only person who knew how to operate the boiler controls. It is possible that the controls have not being used appropriately since his departure.
The centre also started hosting a day centre Monday to Friday 9am until 5pm, which has increased their heating demand considerably.
Also weather patterns can influence people's attitudes to heating. We have had a particularly wet summer, leading to an increased demand for heat.
Since these results have been collated a professional has reset the boiler controls, so hopefully they're meter readings will continue to show savings, rather than an increase in energy consumption.

Graph 1



(Source: Culley, 2008)

4. Case Study 2

Location: Nuneaton, Warwickshire
Energy Saving Measures Implemented:
Cost: £16,210.00
The U-value has not been altered by this installation

4.1 The Building

A community hall attached to a church hosting a variety of services and activities including parent and toddler groups, youth club and music lessons. The building is around 20 years old. It is constructed of conventional cavity brick with no cavity wall insulation. The two pitched roofs have not been insulated and the majority of the windows do benefit from U-PVC double glazing, with wooden frames. However some of the frames are in poor condition.
The building is heated via a gas fired, warm air, ducted heating system, which was installed when the building was built. The heater is located outside, a good distance from where the ducting enters the building. The system was likely to be losing a significant amount of heat, due to the length of ducting with inadequate insulation, combined with general deterioration of the plant over time.

The Energy saving recommendations made included;

- Installing cavity wall insulation
- Installing loft insulation
- Replacing the warm air heating system with gas central heating

The buildings management committee decided all of the recommendations were important, but they decided to break it down into phases, due to the nature of the work and finances required. They decided to concentrate on the heating first, then the insulation. Some professionals may view this as irresponsible mainly because it is thought to be more important to prevent wastage, by insulating the building first, before trying to reduce actual energy consumption.
The warm air system was estimated to be costing them around 50% more than what would be expected for a building of this type.
It was decided the best and most practical solution was to replace the warm air system with a conventional wet central heating system with a gas condensing boiler. This is because there was already a gas supply to the building. Condensing boilers are 90% + efficient and should reduce the running costs the building currently incurs substantially. This system should save approximately 5.7 tonnes of carbon dioxide emissions being released annually (Anon, Consultants).
Other considerations included the community hall is often used by toddler groups so the management committee needed to consider whether to use low temperature radiators, which operate at much lower temperatures than conventional radiators. Alternatively protective radiator covers could be installed. The Management committee also needed to identify a suitable site

for the boiler. It was estimated that they could save around £800- £1200 per year, giving a payback of 7-12years (Anon, consultants).

Figure 3.

(Source: Culley, 2008)

4.2 Results

Table 2. Case Study 2 results

Time Period	Gas Units Consumed
28/08/2008	
18/07/2008	6
20/06/2008	5
19/05/2008	90
21/04/2008	182
25/03/2008	408
22/02/2008	566
26/08/2007	36
29/07/2007	35
28/06/2007	57
25/05/2007	106
23/04/2007	144
19/03/2007	422
22/02/2007	618

(Source: Culley, 2008)

Using the data collected in Table 2, the number of units used before and after intervention between the period of February to July in 2007 (before), and 2008 (after). Before intervention 1257 units were consumed. After intervention 1382 units were consumed. Converting these units into kWh using the standard conversion calculation

1257 × 2.83 × 1.02264 × 39.25 (caloric value) ÷ 3.6 = 39662.6 kWh

1382 × 2.83 × 1.02264 × 39.25 (caloric value) ÷ 3.6 = 43606.8 kWh

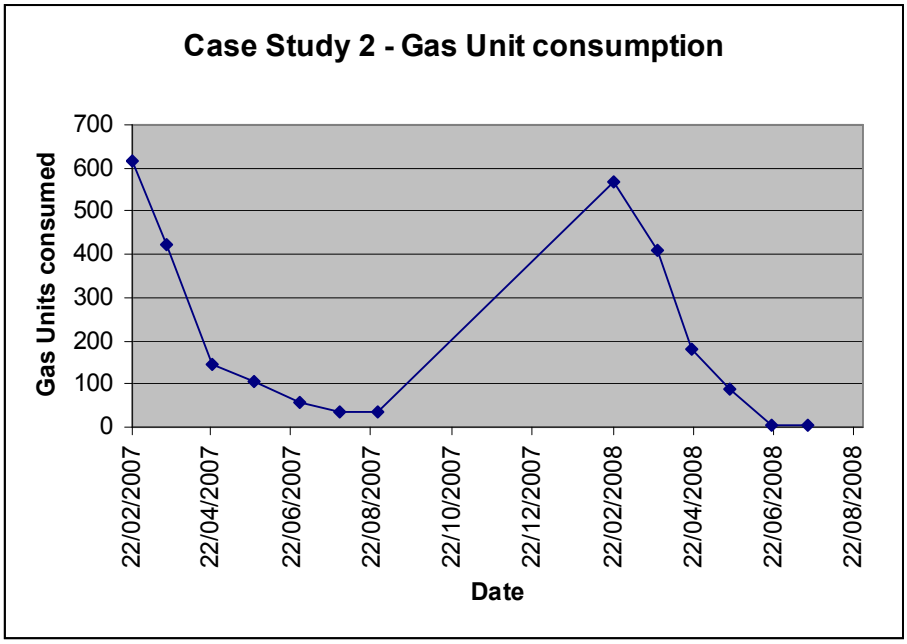
43606.8 – 39662.6 = 3944.2 kWh saved

Carbon Emissions saved 3944.2kWh × 0.194 = 765kg for six months

3944.2 kWh × 3.87p ÷ 100 = £152.64 saving off energy bills during this 6 month period.

This means it would take 53 years to payback the cost of installation. This would not be viable for the average community group to invest into. It is likely that during this period the boiler would need replacing again.
However the savings made to date only represent the first six months after installation. The group have planned to install cavity wall and loft insulation in the next four months. This should also have a significant impact on the future financial and carbon savings made.

Graph 2


Case Study 2 - Gas Unit consumption
Gas Units consumed
700
600
500
400
300
200
100
0
22/02/2007
22/04/2007
22/06/2007
22/08/2007
22/10/2007
22/12/2007
22/02/2008
22/04/2008
22/06/2008
22/08/2008
Date

5. Case Study 3

Location: Exhall, Warwickshire
Energy Saving Measures Implemented: Gas central heating, PVC Windows
Cost: £21,176.91
U-Value before intervention:5.7 W/m² k
U-Value after intervention:2.2 W/m² k

5.1 The Building

The building was originally built around 1880's. It was a school. It is now a community centre, with a whole host of activities, and classes from art classes to belly dancing. Figure 5 shows part of the building, since the energy saving work has taken place. It has solid brick walls and a pitched tiled roof. There is a suspended ceiling in each room, which conceals the roof. The roof has no insulation. The floors are mainly timber suspended and ventilated, and are unlikely to be insulated. Three original windows have been replaced with uPVC double glazed units.
The boiler room is well insulated and laid out, but the Beeston gas boiler is about 25 years. Rooms are heated via fan convector heaters and were installed at the same time as the boiler. The heaters did not have fan speed controls; they were also fairly noisy in comparison to newer models. Some of the room thermostats were broken or badly positioned.
Hot water is provided via three, wall mounted electric storage heaters

Energy saving recommendations;

- Insulating the false ceilings
- Draught proofing doors and windows
- Replace the boiler with a highly efficient gas condensing boiler
- Replace existing fan convector heaters with modern fan convector heaters with fan speed and temperature controls.

The management committee at the community centre decided they would concentrate on replacing the heating system. They also wanted to double glaze the windows, partly due to security reasons. The existing windows were in poor condition, with rotting wood frames. The new windows would need to be in-keeping with the original feature windows.
The management committee applied to Building Sustainable Neighbourhoods to assist with the costs of installing the new condensing boiler, fan assisted heaters and double glazing.
The new heating system was installed in February 2007. Figure 4 shows the new boiler. The double glazed units were installed in May 2007. Figure 5 shows some of the new windows installed.

Figure 4

(Source: Culley, 2008)

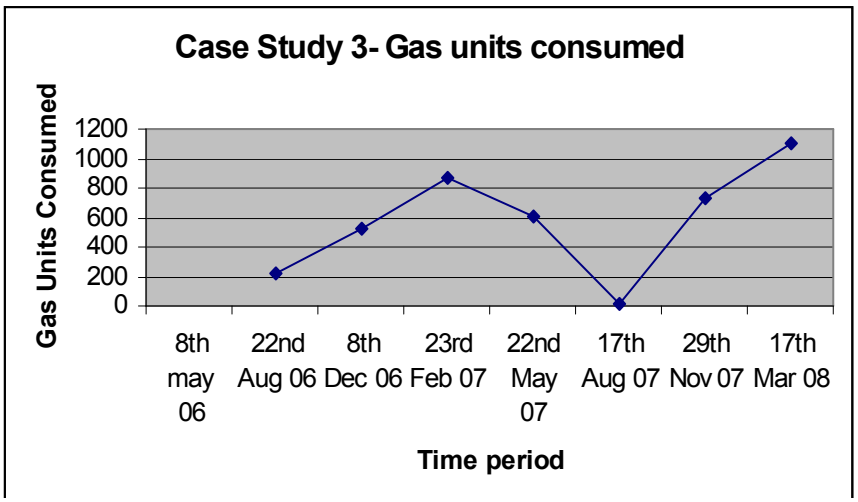
Figure 5

5.2 Results
Table 3. Case Study 3 results

Time Period	Gas Units Consumed
May - July 06	5443.5
Aug -Oct 06	10106.5
Nov -Jan 07	21961
Feb - April 07	26297
May - July 07	6460
Aug -Oct 07	15307
Nov - Jan 08	25071

The results collected in Table 3 do not demonstrate any savings have been made by installing energy saving measures in this building. Graph 3 shows this picture visually, in fact consumption has increased. This is rather disappointing considering the value of the work installed.
The Management Committee and users feel the centre is a more comfortable temperature.
There could be a number of reasons why no savings have been made. The boiler controls may not be being used effectively. The temperature may be set too high or the timer switch may be on continuously.
The centre roof is yet to be restored, which would include insulation. This should make a significant difference to heat loss as approximately 35% can be lost through the roof. (Julia Green, 2004). However this was not insulated previously.
The centre opening times may have increased, increasing the demand for heating.
It is possible the size of the boiler maybe too large for the premises, creating an excessive heat output. A heating engineer maybe required to carry out a heat loss calculation to investigate this theory further.
Originally the water was heated by electric water heaters, now it is heated via the gas boiler.
Further investigation work is required to gain a full understanding and identify an explanation for the results obtained so far.

Graph 3.



6. Discussion

All of the case studies included in the project participated in the Carbon Footprint Initiative, and were successful in obtaining an 80% grant towards the energy saving measures installed. Therefore the cost to the individual centre is minimal and they will not have to wait as long to start reaping the financial savings.
Also due to the rising costs of gas groups may save money before the predicted payback period.
The first case study demonstrates cavity wall insulation is a worth while energy saving measure, which more community buildings should consider if they have a suitable building. However it also demonstrates that there are other influencing factors in order to actually reduce consumption. The measures alone are not necessarily enough to make an impact, it's related heavily to education of people, awareness of how to save energy and use controls appropriately.
The case studies examined also demonstrate that it is not necessarily the large, visible measures that make significant impacts on energy consumption.

All of the installed energy saving measures in this project only made a direct impact on the gas consumption. It would also be interesting to examine the electric consumption to see if by centre staff, volunteers, and users becoming more energy aware, it made an impact on the consumption.

7. Conclusion

As the results show, trying to reduce energy consumption by merely installing energy saving measures is not always sufficient to make a significant impact. Individual and organisational behaviour and perspectives need to change for energy consumption to be reduced.

8.1 Potential Funding

Funding Title	Additional Information
Building Sustainable Neighbourhoods - Carbon Footprint Fund	Carbon Footprint funding re-opens on 1st October 2008. Groups can apply up to £15'000.00. They must own or long term lease a community building and pay their own utility bills.
Community Sustainable Energy Programme	Capital & Development grants up to 50% of the project costs to install renewable technologies www.communitysustainable.org.uk info@communitydudtainable.org.uk Tel: 0845 367 1671
Low Carbon Buildings Programme – Phase 2	www.lowcarbonbuildings.org.uk Provides grants to install mircogeneration technologies. Normally 30- 50% of installation costs.
02 Community fund	www.itsyourcommunity.org.uk Provides grants between £100- £1000 for groups and individuals for anything that can be shown to benefit your community. hello@itsyourcommunity.co.uk Tel: 0800 902 0250
WREN Landfill Communities fund	www.wren.org.uk Email: wren@wren.org.uk Tel: 01953 717165 Funding for community based projects "for the protection of the environment, the provision, maintenance or improvement of a public park or other amenity in the vicinity of a landfill site"(www.wren.org.uk)
SITA Enhancing Communities Programme	Supports improving community facilities to be more energy efficient Must be within 10 miles radius of SITA landfill site Tel: 01454 262910 www.sitatrust.org.uk
BIFFA Award	Grants supporting improving and providing public amenities. Must be within a 10 miles radius of a Biffa Waste Operation. www.biffaward.org Tel:01636 670000 grants@rswt.org
CEMEX Community fund	Application form and guidance on www.cemexcf.org.uk/index.php?section=application&page=2 Grants between £1000 - £15000 within 10 mile radius of Cemex works Email : cemexcf@yahoo.co.uk Cemex community fund ltd, PO Box 53978, London, SW15 1UU

Bio-Energy Capital Grants & Infrastructure scheme	DEFRA – scheme currently closed – due to re-open Oct 08 www.defra.gov.uk/farm/crops/industrial/energy/capital-grants.htm Grants towards installing Combined Heat and Power & Biomass infrastructure
EDF Energy Green Fund	Grants for feasibility studies and capital grants to install small scale renewable technologies Email: mark.thompson@edfenergy.com or nigel.french@edfenergy.com
ScottishPower Green Energy Trust	greenenergytrust@scottishpower.com Tel: 0141 568 3492 Grants towards installing renewable technologies and educating the public on renewables
E-on source	Grants up to £30'000.00 towards energy efficiency or installing renewables source@eon-uk.com

8.2 Useful contact details

These contacts maybe useful if you want to reduce your own carbon footprint. They may also help you investigate saving energy in your own building whether it is a domestic home or business premises.

BERR Department for Business, Enterprise and Regulatory Reform
Tel: 020 7215 5000 enquiries@berr.gsi.gov.uk

Café – Community Action for Energy
Tel: 08448 480 077 www.energysavingtrust.org.uk/cafe/welcome
Supports Community groups with Energy saving and renewable Technology

Carbon Trust – www.carbontrust.co.uk Telephone 0800 085 2005
Offer advice and assistance to Businesses particularly including carbon footprint, free audits for large businesses and interest free loans for energy saving measures

DEFRA - Department of Environment, Food and Rural Affairs
Tel: 08459 33 55 77 www.defra.gov.uk Email helpline@defra.gsi.gov.uk

Energy Saving Trust
Tel: 0800 512 012 www.est.org.uk
Provides independent energy advice and support

NEA - National Energy Action
Tel: 0191 261 5677
Provides energy efficiency and saving advice to low income individuals and families

WEEAC – Warwickshire Energy Efficiency Advice Centre
Tel: 01789 842898
Promote energy conservation and provide advice to householders and small businesses in Warwickshire

9.1 References

Books

Energy Advice Handbook Julia Green Energy Inform 2004 ,11-2 pg
ISBN 0-907800-16-5

Websites

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10. Appendix

10.1 Case Study 1 – Meter readings

Gas Meter readings

Date	Gas readings	Units used	No of days		
28/09/2005	21348				
24/03/2006	24444	3096	177	17.49152542	
27/06/2006	25385	941	95	9.905263158	Boiler not working
20/09/2006	25456	71	85	0.835294118	
13/12/2006	26504	1048	84	12.47619048	
12/03/2007	27663	1159	89	13.02247191	
18/06/2007	28499	836	100	8.36	Cavity Wall insulation installed
26/09/2007	28997	498	103	4.834951456	
04/12/2007	29547	550	65	8.461538462	
18/02/2008	30566	1019	75	13.58666667	
11/03/2008	30893	327	22	14.86363636	
Total	**9545**	**9545**	**895**		

Calculate	
kWh	301561.0132
kWh / day	336.9396795

10.2 Case Study 2 – Meter readings

Date	Meter reading	Units used	actual or estimate	
28/08/2008	88450		a	
18/07/2008	88444	6	e	
20/06/2008	88439	5	a	
19/05/2008	88349	90	e	
21/04/2008	88167	182	a	
25/03/2008	87759	408	a	
22/02/2008	87193	566	e	Installation of new heating system
21/01/2008	85993	1200	a	
			e	
			e	
22/10/2007	84375		e	
27/09/2007	84127	248	a	
26/08/2007	84091	36	e	
29/07/2007	84056	35	a	
28/06/2007	83999	57	a	
25/05/2007	83893	106	e	
23/04/2007	83749	144	a	
19/03/2007	83327	422		
22/02/2007	82709	618		
16/01/2007	82040	669	e	
			e	
			e	
			e	
29/09/2006	80005		a	
25/08/2006	79947	58	e	
29/07/2006	79889	58	e	
20/06/2006	79835	54	a	
17/05/2006	79214	621	e	
11/04/2006	78594	620	a	
			e	
			e	
10/01/2006	76421		e	

10.3 Case Study 3 – Meter readings

Gas Meter Readings

Date	**Reading**	**Units Used**	**kWh used**	**No of Days**	
8th may 06	8339 (e)				
22nd Aug 06	8566 (e)	227	7258	106	68.4717
8th Dec 06	9088 (a)	522	16584	108	153.5556
23rd Feb 07	9952 (a)	864	27339	77	355.0519
22nd May 07	554 (a)	602	18942	88	215.25
17th Aug 07	561 (a)	7	220	87	2.528736
29th Nov 07	1287 (a)	726	22853	104	219.7404
17th Mar 08	2396 (a)	1109	34909	109	320.2661

10.4 Work Timetable

Date	Hours	Task
9th, 24th 25th July, 8th, 11th, 14th 20th 21st 24th 25th Aug 08	39hrs	Reading literature and research
31st March, 14th April 08,4th Aug	9 hrs	Researching external funding
18th Feb, 17th, 18th March 08, 23rd 24th Aug	29hrs	Collecting data from community buildings
3rd, 4th March 1st, 21st, 22nd April, 16thMay, 30th June 08, 1st Sept	25 hrs	Inputting & composing data onto the computer
15th, 29thApril, 6th , 16th May, 30th June 20th 21st 22nd July 18th 22nd 28th 29th Aug 1st Sept	34hrs	Analysing data from community centre's
30th June, 15th 22ND 28TH 29TH July 4th 5th 6th, 7th,11th 12th 13th 18th 19th 20th 23rd 24th 25th 26th 27h 28th 29th 30th 31st August 1st Sept	57 hrs	Composing project report